

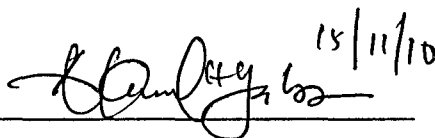
**ELASTIC AND STRUCTURAL STUDIES OF Er³⁺ DOPED
TeO₂-Nb₂O₅-ZnO TELLURITE GLASSES**

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ABSTRACT

ELASTIC AND STRUCTURAL STUDIES OF Er^{3+} DOPED $\text{TeO}_2\text{-Nb}_2\text{O}_5\text{-ZnO}$ TELLURITE GLASSES

Erbium doped tellurite glass with starting composition of $75\text{TeO}_2\text{-(10-x)Nb}_2\text{O}_5\text{-10ZnO-(x)Er}_2\text{O}_3$ ($x = 0\text{-}2.5$ mol%) have been prepared by melt-quenching method and the effect of Er^{3+} doped on elastic and structural properties was studied. Ultrasonic longitudinal and shear velocity showed initial decrease of 1.39% and 3.29% respectively at $x = 0.5$ mol%. For $x > 0.5$ mol%, longitudinal velocity showed an increase and fully recovery at $x = 2.5$ mol%. Longitudinal, shear and Young's modulus showed similar drop at $x = 0.5$ mol% followed by recovery at $x > 0.5$ mol% while bulk modulus showed an increased with Er_2O_3 . Infrared (IR) absorption spectra showed increase in intensity of NbO_6 assigned peak accompanied by increase in intensity of ZnO_4 tetrahedral and TeO_4 trigonal bipyramid (tbp) assigned peaks indicating formation of both non-bridging oxygen (NBO) and bridging oxygen (BO) respectively, at $x = 0.5$ mol% of Er_2O_3 . The initial drop in ultrasonic velocity and related elastic moduli observed at $x = 0.5$ mol% indicates weakening of network rigidity of the glass system due to structural modification as an effect of Er^{3+} doped in small amount and existence of NBO. However, further increase of Er^{3+} doped at $x > 0.5$ mol% contributed to increase in BO causing rigidity of the glass network to improve.